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ABSTRACT

Estimates of supply and demand balances for college graduates in various fields of study are affected by migration and transfers between occupations. Although there are no current statistics detailing population relocation and shifts between occupations, it is possible to infer the general magnitude of these forces from earlier census data. In 1965-1970 the south had more professional-technical and managerial-administrative personnel moving into the region than moving out. If this experience were to apply in 1980, considerable additional competition would be created for newly emerging college graduates from southern colleges and universities. However, to the extent that southern institutions begin to produce sufficient graduates to meet occupational requirements within the region, migration from outside the region, formerly necessary to fill the technical-professional and managerial deficits, should become a less significant factor. (Author/MSE)

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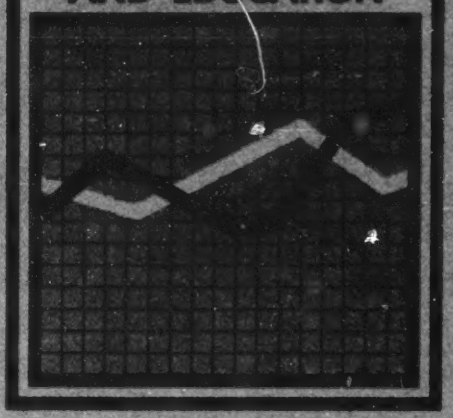

MIGRATIONAL AND OCCUPATIONAL CHANGE

Implications for College Manpower Supply and Demand in the SREB States

SOUTHERN REGIONAL EDUCATION BOARD

HIGHLIGHTS

Estimates of supply and demand balances for college graduates in various fields of study are affected by migration of the population and by transfers of persons between occupations. Heretofore both of these movements have not been included in supply-demand projections for the Southern region.

Although there are no current statistics detailing population relocation and shifts between occupations, it is possible to infer the general magnitude of these forces from earlier census data.

In the 1965-1970 period, according to a limited U.S. Bureau of the Census sample, the South had more professional-technical and managerial-administrative personnel moving into the region than moving out.

If the 1965-1970 migration and occupational transfer experience were to apply in 1980, it is estimated that net migration of college-educated persons into the region will be sufficient to fill 8.5 percent of the projected 1980 openings for college graduates. Additionally, net occupational transfers into occupations requiring a college degree would account for 12.5 percent of available openings.

According to these estimates, occupational transfers and migration together would be sufficient to fill 21 percent of available 1980 openings for college graduates in the region. These supply adjustments would thereby create considerable additional competition for newly emerging college graduates from Southern institutions.

To the extent, however, that Southern educational institutions begin to produce sufficient graduates to meet occupational requirements within the region, migration from outside the region formerly necessary to fill professional-technical and managerial deficits should become a less significant factor.

MIGRATIONAL AND OCCUPATIONAL CHANGE

Implications for College Manpower Supply and Demand in the SREB States

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FOREWORD

The Manpower and Education project of the Southern Regional Education Board from time to time has developed and disseminated information about college-level manpower supply and demand in the region and in the separate states. The basic rationale of the Board, since its inception, has been to promote the sharing of higher educational resources, a philosophy which implies variation between states in facilities available for training advanced manpower and likewise assumes variations in the numbers being trained in the respective occupational fields. College graduates, particularly those with advanced degrees, normally compete in a regional job market.

Mobility of the labor force as a whole, whether geographically--from state to state--or occupationally, is an ongoing process which facilitates advancement of individual opportunity and enhances the economic and social potential of the region as a whole.

In the past, the Board has analyzed ways in which migration has affected the state-by-state supply of manpower in particular professions such as medicine or architecture. The present study breaks ground in demonstrating the way in which geographical migration and occupational change have contributed to the total flow of available advanced manpower in a region. The discussion is based on information from a single five-year period, 1965-70; those who are interested in the nature of the demographic dynamics here analyzed may explore, with the authors, the usefulness of applying that experience to 1980 projections in manpower supply. Highlights of the report are summarized opposite the title page.

Winfred L. Godwin
President

Introduction

Earlier Southern Regional Education Board manpower reports have examined the balances of projected college graduates and occupational openings in 1980 for a comprehensive list of occupations and fields of study for the 14-state SREB region and for the individual states.[1] This report* assesses the effect of adding two variables to the previous consideration of the supply and demand for college graduates: (1) interstate migration of workers, and (2) workers shifting from one occupation to another, both based on extrapolation of previous rates.

In recent years there has been growing attention to the role of migration in distributing the labor force geographically, and restructuring the local stock of human capital.[2] This particularly applies when considering the highly mobile professional, technical, and managerial occupations, whose workers generally receive their formal training in institutions of higher education. Although recent evidence indicates that the earlier U-shaped relationship of migration and occupational status may now be a more nearly linear positive relationship, the fact remains that professional workers have continued to migrate at high rates for the past thirty years.[3] Similarly, the history of outmigration from the South, by the black population in particular, has long been recognized as a significant variable in altering the supply of potential workers.[4]

Occupational shifts by workers have also received attention in recent research as a significant factor in manpower supply-demand analyses. For example, a study group within the larger Social Science Research Council's Committee on Work and Personality in the Middle Years was created to identify life cycle issues that relate to the supply of labor. It argued that concern for the geographic migration of workers should be expanded to include occupational mobility, or the movement from one occupation to another.[5] Both items were included in the groups findings as part of a larger list of life cycle factors affecting the number of workers available and competing for openings in occupations.

A Bureau of Labor Statistics (BLS) model of occupational supply concludes that, although the requisite data are difficult to obtain, both occupational and geographic mobility must be accounted for as supply components.[6] In the BLS supply system, workers moving from another occupation and/or another location augment workers returning from the military and from temporary retirement and new workers from training programs.

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*An earlier draft was reviewed by Dr. Larry D. Schroeder and Dr. Paula E. Stephan, Department of Economics, Georgia State University. The authors wish to acknowledge the valuable suggestions of each; full responsibility for the opinions expressed in the paper, however, is borne by the authors.

Two college-level manpower studies for states have dealt with these concerns but have not included mobility adjustments because of data inaccessibility. The report of an Oregon project discusses only the tendency for migration patterns of recent graduates to disrupt a straightforward comparison of graduate supply with demand at the state level.[7] An Alabama study concerned itself at length with both occupational and geographic mobility as central supply issues, but determined that the lack of necessary detail for both variables precluded their use at the time the project was conducted.[8]

Projections of labor supply and demand for Colorado through a dynamic model recognize the impact of interstate migration, and the anticipated supply of labor force entrants is adjusted accordingly.[9] Net worker immigrants are added to resident labor force entrants to determine total worker supply for the 1970-80 period.

Reports of a recently developed complex system for projecting manpower requirements for the Georgia agriculture industry discuss both occupational movement and geographic migration as two of the "disturbances" that interfere in the calculation of what is called retained manpower.[10] Subsequent expanded versions of the model for all Georgia industries include occupational and geographic mobility adjustments.[11]

The magnitude of migration and occupational transfer effects upon supply and demand balances for college-level workers was estimated in another recent analysis for Georgia which served as pilot research for the present report.[12]

Occupational Movement and Geographical Migration of College-Level Workers, 1965-70

Adjustment of 1980 manpower projections for estimated effects of occupational transfer and geographical migration must necessarily be made on the basis of extrapolations from earlier observations. This report assumes that application of 1965-70 trends is feasible for adjustment of 1980 supply projections.

Migration

The basic data sources for both nonmigrant transfers and interstate labor mobility were the 1/100 Public Use Sample (PUS) files for states from the 1970 Census of Population.[13] A special subfile was created selecting all employed nonmilitary 1965 residents of a state who lived in another state in 1970 (outmigrants), and 1970 residents of a state living in another state in 1965 (inmigrants). Tabulations were prepared identifying the 1965 occupation of outmigrants, which may be thought of as a subtraction from the existing supply of workers in each state. Inmigrants were tabulated by their 1970 occupation and may be thought of as part of the additional occupational supply due to migration or simultaneous migration and occupational transfer in each state. The particular state destinations of outmigrants and the origins of inmigrants were not important to the present analysis and were not retained.

Occupational Movement

Similar files and tabulations were constructed for employed nonmilitary nonmigrant residents of a state who had changed occupations between 1965 and 1970. Workers leaving an occupation between 1965 and 1970 may be thought of as a subtraction from the supply available in that occupation, while workers shifting into a 1970 occupation may be thought of as additional supply for that occupation. One way of viewing the effect of occupational transfers on the supply of workers for occupations is to consider it as a "promotion process." As workers from the less skilled occupations acquire experience, they are promoted (or transfer) to higher level occupations and, thus, constitute an added supply of workers competing with college graduates for professional, technical and managerial jobs.

Findings for Major Occupational Groups

Professional-Technical Occupations. Both the magnitude and interstate flow patterns of migrants for two major occupational groups may be observed in Tables 1 and 2. The period covered is 1965-70 and the figures in the tables represent migrants for the entire five years, expressed in 100's. No adjustment is made in Tables 1 and 2 for the proportion of migrants estimated to be college graduates. Table 1 indicates wide variation in total migrant activity levels for the Southern states. For example, West Virginia received only 8,900 total professional-technical migrants from other states while 73,900 were attracted to Texas during the five-year period. The exchange of worker flows may be illustrated easily by the companion finding that these same two states lost 13,300 and 55,900 professional-technical workers, respectively, to other states during the same time period. In the exchange, then, West Virginia experienced a net loss of 4,400 professional-technical workers in the state-to-state migration interchange while Texas gained 18,000 workers.

It is also instructive that the Southern region as a whole acquired 253,800 professional-technical workers through migration from other U.S. states while losing 201,400 professional workers to other parts of the nation. Of the total professional-technical migrants to Southern states from anywhere in the country, (3.3% annually of the total in 1970) 56.2 percent were supplied by non-Southern states. The reliance upon other parts of the U.S. for professional-technical inmigrants varied greatly from state-to-state, ranging from 32 percent in Mississippi to 72 percent in Maryland. There was a systematic variation, however, in the proportion of professional inmigrants from non-Southern states in the border states as opposed to the "interior" South. Maryland, West Virginia, Kentucky, Arkansas and Texas all received a substantially higher proportion of their professional inmigrants from other parts of the nation than did the remainder of the Southern states.

It also is evident from the body of Table 1 that no one state was distinguished as a predominant consumer or supplier of professional migrants from other Southern states. As an illustration, 19 percent of the professional migrants to Louisiana were provided by Texas. This is the largest single percentage to be found in the state-to-state interchange for Southern states. Texas also supplied 18 percent of Arkansas' professional inmigrants, Louisiana provided 17 percent of the Mississippi professional inmigrants,

Table 1

Origins and Destinations of Interstate Migrants, Professional-Technical Occupations, 1965-70 (in 100's)

Migrating from:	*Migrating To:* AL	AR	FL	GA	KY	LA	MD	MS	NC	SC	TN	TX	VA	WV	Regional Total	Other U.S.	Total
Alabama	--	2	33	36	4	9	8	13	9	7	14	21	12	--	168	88	256
Arkansas	2	—	6	2	1	8	—	7	1	—	13	23	2	—	65	73	138
Florida	22	2	—	54	5	9	18	3	18	8	19	31	29	1	219	213	432
Georgia	17	—	36	—	2	6	12	2	15	19	16	17	11	—	156	116	272
Kentucky	4	1	12	9	—	—	6	2	11	1	13	5	12	4	80	157	237
Louisiana	5	8	20	17	5	—	4	17	2	1	12	60	3	—	154	102	256
Maryland	2	0	22	5	1	1	—	—	11	4	3	10	41	6	106	246	352
Mississippi	6	3	6	10	5	15	2	—	2	1	19	17	5	—	91	59	150
North Carolina	5	—	31	29	5	7	26	1	—	24	11	16	47	2	204	133	337
South Carolina	4	—	12	33	2	1	5	4	29	—	11	5	11	1	118	52	170
Tennessee	19	6	13	34	19	8	6	10	12	6	—	14	11	2	160	95	255
Texas	11	17	25	19	4	28	22	6	15	6	13	--	13	6	185	274	559
Virginia	5	1	24	11	7	5	55	3	36	10	19	19	—	10	205	241	446
West Virginia	2	1	9	3	9	3	10	1	5	1	2	2	20	—	68	65	133
Within Region	104	41	249	262	69	100	174	69	166	88	167	240	217	32	1,979	2,014	3,993
Other U.S.	51	55	425	133	108	49	456	32	158	62	99	499	355	57	2,538		
Total	155	96	674	395	177	149	630	101	324	150	266	739	572	89	4,517		
% of Immigrants from Non-Southern States	32.9	57.3	63.1	33.7	61.0	32.9	72.4	31.7	48.8	41.3	37.2	67.5	62.1	64.0	56.2		
Average Annual In-migration as % of 1970 Employment	2.2	2.9	4.1	4.0	2.9	2.0	4.5	2.3	3.0	2.9	3.1	2.6	4.4	2.7	3.3		

Source: Special tabulations from the 1970 Census of Population 1/100 Public Use Sample computer tape files.

and 16 percent of the South Carolina professional inmigrants originated in neighboring North Carolina. All other Southern interstate origin-destination percentages were below that level. This finding, in combination with the lack of empty cells in Table 1 and the fact that some 198,000 professional workers moved from one Southern state to another during the period, documents the active and complex system exchanging highly trained Southern professional-technical manpower between states.

Managerial and Administrative Occupations. A similar profile of mobility is found in Table 2 for managerial and administrative workers, with a few small variations on the general theme. First, the volume of migration was much smaller, supporting once again the long-standing observation that professional-technical workers move more regularly than other occupational groups. Nonetheless, the percentage of managerial migrants to Southern states coming from other regions of the U.S. was identical with the professional category (56 percent).

The range of reliance upon non-Southern states for inmigrants was somewhat larger for this occupational group than for professional workers. West Virginia obtained the lowest proportion of its inmigrating managerial workers within the region (73 percent from non-Southern states) and Alabama relied most heavily upon the region, with only 24 percent coming from elsewhere in the nation.

The interstate network of origins and destinations shows a slightly greater tendency to concentrate on particular states than is observed for professional migrants. Of the North Carolina managerial inmigrants, 26 percent were supplied by Virginia. Similarly, 26 percent of the South Carolina managerial inmigrants originated in North Carolina. This is in contrast to a maximum percentage of 19 percent for any pair of Southern states in the professional-technical findings. In general, however, the managerial data resemble the professional-technical occupations in the pattern of college-trained migrants supplying manpower both to other Southern states and the rest of the nation, and receiving a return flow from those same areas.

The Estimated Effect of Regional Migration and Occupational Change on the Supply of College-Level Manpower in 1980

Conceptual Framework

The reader should be briefed on the overall conceptual framework of this analysis in which migration is treated as a supply variable. The projection of occupational openings in this and similar manpower analyses depends on employment projections which are interdependent with a population and labor force projection supporting the employment projection. Employment is the independent variable, and population is assumed to arrange itself according to an economic determination. The National Planning Association regional employment projections, which form the basis for the occupational openings reported in this analysis,[14] assume that the employment shifts between regions

Table 2

Origins and Destinations of Interstate Migrants Managerial and Administrative Occupations, 1965-70 (in 100's)

Migrating From:	*Migrating To:* AL	AR	FL	GA	KY	LA	MD	MS	NC	SC	TN	TX	VA	WV	Regional Total	Other U.S.	Total
Alabama	—	1	15	15	—	2	1	5	6	2	8	5	3	—	63	25	88
Arkansas	—	—	1	1	—	6	—	3	2	—	7	8	1	—	29	27	56
Florida	8	2	—	37	3	3	8	6	3	4	4	14	8	—	100	95	195
Georgia	5	1	17	—	—	3	—	2	8	9	12	8	4	—	69	50	119
Kentucky	1	1	2	—	—	—	—	1	1	—	4	3	2	—	15	47	62
Louisiana	3	3	2	4	—	—	1	10	1	—	5	18	3	—	50	22	72
Maryland	1	—	8	4	2	1	—	—	7	—	—	5	16	4	48	72	120
Mississippi	8	—	3	5	—	13	—	—	1	—	9	10	—	—	49	11	60
North Carolina	5	1	6	16	1	1	7	2	—	14	4	3	13	—	73	41	114
South Carolina	3	—	4	10	—	1	3	—	15	—	3	1	5	—	45	20	65
Tennessee	9	5	6	15	8	—	4	10	3	7	—	3	3	—	73	34	107
Texas	3	9	15	8	3	14	4	7	4	2	3	—	4	2	78	188	266
Virginia	1	0	18	8	2	3	18	3	35	5	6	6	—	1	106	94	200
West Virginia	—	—	4	—	3	—	6	—	2	—	1	—	7	—	23	28	51
Within Region	47	23	101	123	22	47	52	49	88	43	66	84	69	7	821	754	1,575
Other U.S.	15	31	270	91	41	27	134	16	49	11	48	224	88	19	1,064		
Total	62	54	371	214	63	74	186	65	137	54	114	308	157	26	1,885		
% of Immigrants from Non-Southern States	24.2	57.4	72.8	42.5	65.1	36.5	72.0	24.6	35.8	20.4	42.1	72.7	56.1	73.1	56.4		
Average Annual In-migration as % of 1970 Employment	1.4	2.0	2.8	3.0	1.7	1.5	2.9	2.3	1.8	1.7	2.1	1.4	2.2	1.2	2.0		

Source: Special tabulations from the 1970 Census of Population 1/100 Public Use Sample computer tape files.

of the U.S. will bring about the necessary labor force shifts. (See Appendix 1 for methods on projection of openings.) The occupational openings resulting from such labor force and population shifts are included in the employment projections through the multiplier effect that employment changes in "basic" industries produce on the "non-basic" industries.

The population shifts projected between U.S. regions during the 1970's have been taken into consideration in the projection of college degrees for the region in 1980. (See Appendix 1 for methods on projection of supply.) The number of 18-to-24-year-olds in the Southern states who constitute the base for the primary projection of college degrees has been adjusted to reflect the population shifts for this decade and, therefore, includes the effects of migration for this sector of the population. Adding another supply factor of migration, as is done in this report, accounts for that portion of migration of the stock of college-educated persons not accounted for in the projection of new college graduates.

Expansion of the Sample Data

The 1965-70 occupational and geographic mobility data have been expanded from the original sample data. In Tables 1 and 2 selected migration findings for 1965-70 are shown for the total five-year period. Two adjustments are made to the migration and occupational transfer findings presented in Table 3: they are converted (1) to an average annual estimate, and (2) to the proportion of the annual total in each occupation projected to be college-educated. These conversions, included in the Table 3 statistics, insure comparability. College-educated migrants and occupational transfers, both annualized, may then be compared to the projected supply of new college graduates in 1980, and the related projection of average annual openings for college graduates by occupation for the 1975-80 period.

Estimated Effects

The effects of adding estimated migration and occupational transfers to the supply of new college graduates in relation to occupational demand for such graduates are shown in Table 3. The migration findings for each occupation represent the 1965-70 average annual migration in and out of the region of persons with college degrees by their occupations. These in-and-out migration findings are shown in Columns (1) and (2). Similar statistics are shown for persons shifting in and out of occupations in Columns (3) and (4). Column (5) is the total net adjustment resulting from both in-and-out migration and occupational change for each occupation, and may be thought of as an adjustment to the projected supply of new college graduates coming into the labor market in 1980, as shown in Column (6). Since all the net adjustments are positive, indicating more persons available in each occupation because of net migration and net occupational transfer, all the adjustments in Column (5) constitute additions to supply of newly emerging college graduates in 1980, as shown in Column (6). The percentages which the net migration and occupational change supply components constitute of projected occupational openings are shown in Column (7). For comparison purposes,

Table 3

Effect of Applying 1965-70 Average Annual Migration and Occupational Movement to Adjust Supply and Demand Balances Projected for 1980, SREB Region

(Selected Occupations)

Occupation	(1) Migration In	(2) Migration Out	(3) Occupational Change In	(4) Occupational Change Out	(5) Total Net Adjustment	(6) Market-Ready College Graduates 1980	(7) Net Adjustment As Percent Of Projected Openings	(8) Projected Openings For College Workers
TOTAL	42,392	17,647	145,840	109,257	61,327	258,300	21%	290,600
Accountants	1,188	482	3,477	2,323	1,861	6,700	27	6,900
Architects	180	90	361	180	270	1,200	30	900
Communications	597	188	1,232	829	813	4,200	35	2,300
Education	8,645	3,474	25,711	23,949	6,932	67,600	13	54,000
Engineers	4,636	2,130	9,182	6,194	5,494	11,800	48	11,500
Lawyers and Judges	850	203	1,697	864	1,480	7,800	29	5,100
Librarians	255	107	913	457	604	1,900	23	2,600
Social Workers	402	153	1,776	763	1,262	2,500	26	4,900
(Health Occupations)								
Dentists	150	0	225	168	206	1,400	13	1,600
Dental Hygienists	22	5	27	22	22	300	7	300
Health Administrators	158	88	581	264	387	500	26	1,500
Medical Lab Technicians	193	69	308	193	239	2,000	10	2,500
Medical Record Technicians	14	7	48	14	41	100	14	300
Optometrists	35	17	173	0	190	300	95	200
Pharmacists	99	99	345	247	99	2,200	6	1,600
Physicians	1,599	533	895	495	1,466	4,000	27	5,500
Registered Nurses	576	247	683	813	199	4,900	4	5,400
Therapists	156	67	311	167	233	500	12	2,000
Veterinarians	56	0	112	56	112	700	14	800
Other Occupations	22,581	9,688	97,783	71,259	39,417	137,700	22	180,700

Note: Numbers in the body of the table may not add precisely to the total net adjustment due to roumding.

the projected average annual 1975-80 openings in each occupation (or demand projections for college-educated workers) are shown in Column (8). Under the assumption that net migrants and net occupational transfers constitute additions to the supply of college-educated persons available to fill openings, the total supply may be interpreted to be the summation of Columns (5) and (6).

The combined effects of worker migration and occupational shifts are estimated to contribute over 61,300 college graduates (all degree levels) in addition to the supply of new graduates, and the net adjustment reflects that much competition with new graduates in the 20 occupational categories shown.

The total net adjustment of supply for all occupations is sufficient to fulfill 21 percent of the projected annual demand for Southern graduates during the 1970-1980 decade and thereby dampen the general outlook for new graduates. Although the migration and occupational change findings relate to the 1965-1970 period, there is reason to believe that they may also be representative of the 1970's. Occupational change during the early 1970's is likely not to have kept pace with the late 1960's due to unfavorable economic conditions. Nonetheless, the altered migration pattern during the 1970-1975 period, providing the South with nearly three times the net in-migration of the 1965-1970 years, is likely to have more than compensated for the lack of opportunity for occupational mobility.[15] If the economic picture brightens during the late 1970's, it is probable that the net adjustments in the 1970's will be at least as large as those shown in Table 3 on the basis of the 1965-70 period.

The direction of net adjustment to supply in the 20 occupations is similar when migration and occupational change are viewed separately. The net impact of migration is an addition to the supply of college-educated workers for all occupations except pharmacy; the effect is similarly positive for occupational change in all occupations except nursing.

The differential volume of activity in occupational change as opposed to worker migration also must be noted. For all occupations, the net adjustment to supply for the two factors is similar. Migration accounts for 25,000 of the total 61,000 net adjustment while occupational shifts contribute 37,000, or 60 percent. Use of net comparisons badly masks the gross levels of activity, however. Interoccupational movement is observed to be a much more significant force in labor market supply-demand dynamics, with approximately 255,000 in-and-out shifts--over four times the 61,000 gross migration level.

Although substantial levels of occupational change are found in nearly all occupational categories, the contribution of occupational transfers to the total net adjustment varies. Interoccupational movement is responsible for virtually all of the net adjustment to the supply of pharmacists, but accounts for only 25 percent of the total adjustment for teachers and physicians, who tend to be affected more by migration. Other occupations for which large portions of the supply adjustment are attributable to occupational change are librarians (76 percent), social workers (80 percent), health administrators (82 percent), health record technicians (83 percent),

and optometrists (91 percent). These are occupational categories for which a latent supply is hidden in current employment in other related occupations and may serve to significantly confuse supply-demand analyses that do not account for this factor.

Several implications of migration and occupational movement for the new Southern graduate during the 1970's appear to emerge. As economic conditions improve during the remainder of the 1970's, prospects for interoccupational transfer will be enhanced. With accompanying high levels of net inmigration to the Southern states, the competition for job openings will be escalated significantly. If migration and occupational change were to remain at their 1965-70 levels, Table 3 indicates that the supply of workers stimulated by these two factors would absorb 21 percent of all openings between 1970 and 1980, with the range extending from only 4 percent for nurses to 95 percent for optometrists. Most of the percentages are concentrated in the 20-30 percent area, with communications and engineering reaching 35 percent and 48 percent, respectively. The results for nurses are interesting from another perspective also. It is the only category for which occupational transfers out exceed the number of intransfers. This finding is at odds with results for other predominantly female occupations, suggesting that unique recruitment, training, and career incentives must be found.

With a few exceptions, the health professions are affected to a much lesser degree by migration and occupational transfers. The markets and supplies of health administrators, physicians, and optometrists indicate an interregional profile in agreement with non-health occupations, but are at variance with the remainder of the health occupations where the net effect of interoccupational movement tends to be minimal and the supplies of workers are generated from college graduates within the region.

Some Reservations

The results of this study, which indicate that migration and occupational shifts have augmented the supply of workers emerging from colleges in past years within the Southern region and in the individual states, should be interpreted with care. Although the direction of the effect of these two variables indicates they do need to be considered in manpower analyses, the actual numerical net adjustments obtained for all or specific occupations, either for the region or for individual states, are less likely to apply than is the general direction of their influence on supply.

The use of 1965-70 migration and occupational shift values in the comparison against occupational openings in the late 1970's and against production of college degrees in 1980 produces only hypothetical results. However, as was mentioned earlier, migration shifts during the 1970's into the South tend to be even stronger than those of the late 1960's. They may, therefore, offset possibly lower occupational transfer rates during the less prosperous 1970's as compared to the late 1960's.

The strong positive shift of college-educated persons into professional-technical and managerial occupations noted in this paper obviously implies a shift out of other occupations which are depleted of college graduates to the same extent that the gaining occupations are augmented with a supply of college graduates. (This depletion would be reduced to the extent that the transfers constitute persons gaining college degrees after 1965.) In effect, the focus of this paper on the upper stratum of occupations (or those most likely to require persons with college degrees) is bound to show a positive occupational transfer movement into these occupations, since transfers and/or promotions tend to occur from the lower occupational stratum to successively higher ones. Diminution of supply at the lower occupational levels creates opportunities for newly emerging college graduates, albeit at lower occupational levels than those to which they may aspire. The method in this report, which applies college degrees to an estimated proportion of transfers into the professional-technical occupations, implicitly recognizes that in 1965-70 many of the individuals transferring out of lower echelon occupations did have college degrees even while in the vacated occupations. This situation mirrors the one existing today of college graduates initially becoming employed at levels lower than the professional-technical level, but who will gradually transfer into higher level occupations.

Another reservation about the findings relates to the basic data source for the two supply adjustment factors, the Public Use Sample files. The sampling error in the original census migration and transfer returns is substantial and should be taken into account when encountering as few cases as often appear when state-by-state migration is considered. Furthermore, the use of the PUS files for the migration and occupational transfer responses constitutes a sample of a sample, i.e., a one percent sample of respondents to what was originally a sample question. This compounds the sampling error problem even further, and signals extreme caution especially in the use of the findings by individual states.

Finally, questions have been raised concerning the imprecise recall of occupational activities by respondents queried in the Census five years after occupational movement may have occurred. Walsh and Buckholt contend that retrospective questions such as used in the Census are not sufficiently accurate. When such possible inaccuracy is magnified by sampling problems, it is clear that data for occupations with few persons, and/or by states must be viewed with some skepticism.[16]

The limitations outlined above will cause some slippage in gauging the influence of migration and occupational transfers during the 1970's, but nonetheless indicate the direction of their impact upon the supply of college-educated workers.

Summary and Conclusions

In terms both of magnitude and in comparison with demand, migration and occupational change among college-educated workers have been demonstrated as significant sources of manpower supply. Over 56 percent of the professional-technical workers migrating to the SREB states originated outside the region in 1965-70. A complex exchange of interstate migration by college-trained professional and managerial workers also has been documented within the region in which no states tend to dominate as primary nodes of suppliers or consumers.

For the region as a whole, 21 percent of the demand for college-trained workers during the 1970's would be filled by migration and occupational transfers if the levels of the 1965-70 period were repeated. The additional supply augments new graduates in all of the 20 occupational groups considered, accounting for from 4 to 95 percent of the 1970-1980 demand. The health-supporting occupations were found to be generally less affected by migration and occupational change, reflecting a more local and specialized market and training structure.

Over four times as much movement was observed between occupations within the region as geographic mobility into and out of the region. The impact of net occupational movement rather than gross levels, however, was less striking, with occupational change accounting for 60 percent of the adjustment to supply.

The effects of migration and occupational transfers provide substantial additions to the stock of labor supply in competition with new graduates and should be monitored in higher education and manpower planning efforts. More accurate evaluation of the effect of these variables will be possible if and when more precise and timely data of migration and occupational mobility patterns by educational attainment levels become available.

Appendix 1

Glossary of Terminology

Several terms need defining to orient the reader and facilitate communication of the findings.

Projection of Supply

The projections of degrees by level and by state are based on the region's share of U.S. degrees in 1980, according to projections by the U. S. Office of Education (USOE).[17] The distribution of degrees by field of study is based on changes in the distribution in the Southern region from 1964 to 1973, with adjustments to reflect a gradual convergence of the regional distribution toward that projected by USOE for the nation in 1980.

The total number of degrees at all levels projected for the region for 1980 exceeds the 1972 total by 18 percent, assuming moderate growth during the rest of the decade.

Degree Programs

All graduates at all degree levels, have been classified into 20 major fields of study. A selected number of sub-fields, well-recognized as leading to particular occupations, were chosen for separate projections. Examples are nursing and dental hygiene (sub-fields of the major field, "health occupations"), which lead to the specific occupations of registered nurse and dental hygienist, respectively.

Market-Ready Supply of College Graduates

This differentiates the supply of total degrees in any one year, at all levels, from the supply of graduates in that year who are actually new entrants into the labor market. It adjusts for a small proportion of female bachelor's level graduates who do not enter the labor market, for bachelor's degree recipients who continue as full-time graduate students and thus are not available to work, and for graduate students who were already employed full-time in their own fields while earning advanced degrees and do not constitute "new" entrants into the college-level job market.

Openings

Openings in occupations include demand resulting from expansion of employment as industries grow; and from retirement, death, and other separations from the labor force. The openings represent average annual opportunities for the 1970-80 period. The procedures in projecting occupational openings follow the methods of the Bureau of Labor Statistics state cooperative program, with minor modifications.[18] The BLS occupational matrix was

applied to employment-by-industry projections for 1980 developed for each state by the National Planning Association.

In earlier SREB Manpower and Education project reports comparing supply of graduates to occupational openings,[19] two sets of occupational opening projections are shown: those derived from the National Planning Association (NPA) employment projections, and those developed by the Department of Employment Security under the BLS cooperative program in each of the 14 Southern states. Only one set of occupational opening projections--the NPA data--is used as a reference point for the demand component.

Portions of Openings to be Filled by College Graduates

Neither in the high nor in the low projections are all openings in each occupation considered as employment opportunities for college graduates. Instead, a percentage has been developed that represents, for each occupation, the portion of openings to be filled by persons with four or more years of college. This 1980 educational attainment percentage was obtained for each occupation by extending the U.S. pattern of the 1960-70 period to 1980. The 1980 percentage of all college level workers in an occupation was then transformed into the percentage of "new" workers needed with such educational attainment levels.

Appendix 2

Detailed Occupations Comprising Major Occupational Groups

Occupational Group	Detailed Occupation
Accountants	Accountants Real estate appraisers
Architects	Architects
Communications	Editors and reporters Public relations and publicity writers Radio and television announcers
Education	Prekindergarten and kindergarten teachers Elementary school teachers Secondary school teachers Coaches and physical education teachers Education teachers (college) Elementary and secondary school administrators Other teachers, except college
Engineers	Aeronautical and astronautical engineers Chemical engineers Civil engineers Electrical and electronic engineers Industrial engineers Mechanical engineers Metallurgical and materials engineers Mining engineers Petroleum engineers Sales engineers Other engineers Engineering teachers (college) Tool programmers
Lawyers and Judges	Lawyers Judges Law teachers (college)
Librarians	Librarians
Social Workers	Social workers

(Health Occupations)

Dentists	Dentists
Dental hygienists	Dental hygienists
Health administrators	Health administrators
Medical laboratory technicians	Clinical laboratory technicians and technologists
Medical record technicians	Health record technologists & technicians
Optometrists	Optometrists
Pharmacists	Pharmacists
Physicians	Medical and osteopathic physicians
Registered nurses	Registered nurses
Therapists	Physical & occupational therapists
Veterinarians	Veterinarians
Other occupations	All other detailed occupations not listed above

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